REPORT OF THE WORKING PARTY ON THE PROBLEMS ARISING FROM THE CYCLICAL PATTERN OF MACHINE TOOL ORDERS

Corrections

Page 11, line 36, *for* " or machines " *read* " of machines "
Page 15, line 7, *for* " arrangement " *read* " arrangements "
Page 18, lines 33 and 34, *for* " paragraphs 28 and 29 " *read* " paragraphs 29 and 30 "
Page 22, line 19, *for* " wide " *read* " wider "

MINISTRY OF TECHNOLOGY
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INTRODUCTION

We were appointed in July, 1965, as a Working Party with the membership listed on p. ii, 'to examine and report to the Minister of Technology on the problems arising from the cyclical pattern of machine tool orders, and on measures to alleviate them.'

We have held twelve meetings, and have considered written evidence from the Machine Tool Trades Association (M.T.T.A.) and from five individual member companies of the Association, and both written and oral evidence from Mr. D. W. G. L. Haviland, Chairman of Staveley Industries Limited, and Mr. R. D. Young, Vice-Chairman of Alfred Herbert Ltd., on proposals associated with their companies.

Acknowledgements

We should like to express our thanks to all those who have supplied material for our consideration, attended our meetings to give us the benefit of their views or in other ways assisted us in our task, and particularly to our Secretary, Mr. Coffin, and his assistant, Mr. Woolford, whose services have been invaluable.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

OUR main conclusions and recommendations can be summarized as follows:

(i) Cyclical fluctuations in machine tool orders are not due to fluctuations in investment by any single industry (*paragraph 3*). Their immediate cause appears to be the general lack of any long-term planning by user industries, though they are of course part of more general movements in the U.K. economy (*paragraph 5*).

(ii) There is some evidence that the peaks in machine tool orders follow peaks in orders for mechanical engineering in general (*paragraph 4*); this accentuates the effects of the cycle on the machine tool industry (*paragraph 9*).

(iii) Although the pattern of orders and deliveries in some other important producing countries is similar to that in the U.K., the amplitude of fluctuations in production has in most cases been greater in those countries (*paragraph 6*).

(iv) A number of other capital goods industries experience similar fluctuations in orders to those for machine tools (*paragraph 7*). Fluctuations in orders are greater than those in output; over 75 per cent of the output of the machine tool industry has been unaffected by cyclical fluctuations during the past eleven years. It does not therefore appear that the industry is exceptionally affected by such fluctuations (*paragraph 12*).

(v) The seriousness of the cyclical effects on the machine tool industry varies from company to company (*paragraph 9*), but the main problem for the industry as a whole is that of maintaining its labour force (*paragraph 10*).

(vi) The balance of payments has suffered, because machine tool capacity has not expanded to match the growth in orders, resulting in additional imports and loss of exports (*paragraph 15*). Imports of machine tools have fluctuated rather more than home deliveries (*paragraph 16*).

(vii) Direct government assistance to machine tool firms would do little to help the most efficient avoid the effects of cyclical fluctuations of orders, and would chiefly serve to make life easier for the less efficient (*paragraph 18*).

(viii) Forward planning of investment by users of machine tools in consultation with their suppliers is most important in the interests of both users and manufacturers as well as of the economy as a whole; it should be encouraged by the Government's proposals for investment grants (*paragraphs 19, 20 and 44*).

(ix) There are a number of difficulties about investment reserve schemes such as that put forward by M.T.T.A. (*paragraphs 21-23*). In the light of these, and of other measures currently being taken to encourage productive investment and longer term planning, the introduction of such a scheme is not recommended at the present time. If however there is no improvement in the cyclical pattern of orders, and if this appears to be having serious effects on the economy, the possibility should be studied further (*paragraphs 24 and 25*).

(x) The introduction of a scheme for Government insurance of stockbuilding by machine tool manufacturers such as that proposed by the Chairman of Staveley Industries Ltd. would not be justified (*paragraphs 29 and 30*). But individual manufacturers may benefit from prudent stockbuilding (*paragraph 31*).

(xi) Leasing has some advantages over outright sale in encouraging customers for machine tools to plan ahead (*paragraph 33*). The machine tool industry should encourage its salesmen to bring leasing facilities to the attention of prospective customers (*paragraph 34*). If lessors could offer a lease terminable after one or more years without losing the benefit of investment grants, this might encourage users to try out new machine tools in their own works (*paragraph 35*).

(xii) The scheme for contract plant replacement devised by Alfred Herbert Ltd. should encourage the forward planning of orders by machine tool users, and the industry should examine the possibility of extending it on an industry-wide basis (*paragraph 37*). To increase the attractions of such a scheme, consideration should be given to the introduction of a bonus, in addition to the standard investment grant, for users who enter into approved long-term contracts for plant (*paragraph 39*).

(xiii) No attempt should be made to vary the rate of investment grant counter-cyclically (*paragraph 40*).

(xiv) Operational Research and similar techniques could play an important part in helping machine tool manufacturers to minimize the effects of cyclical fluctuations, by facilitating forecasts of market demand and control of production and inventory (*paragraph 41*). But the Government and the machine tool industry should give attention to improving the available statistics, if maximum advantage is to be derived from such techniques (*paragraph 42*).

(xv) Fundamental changes of attitude are needed on the part of both user industry and the machine tool manufacturers themselves (*paragraph 43*).

(xvi) An expansion of capacity for machine tool manufacture is desirable to improve the industry's ability to compete with imports at the peak of the cycle (*paragraph 45*), while a reduction in cyclical fluctuations should effectively increase capacity (*paragraph 46*). An increase in exports, and diversification of home markets, would help to lessen the impact of the cyclical fluctuation of orders (*paragraph 47*), as would a reduction in the industry's dependence on skilled labour through the wider adoption of numerical control and other advanced techniques (*paragraph 48*). Concentration of the industry into stronger units should also help (*paragraph 49*).

(xvii) The Government has an important part to play by providing the conditions necessary for a steady rate of economic growth (*paragraph 50*), and by urging industrialists to plan regular purchases of new plant (*paragraph 51*). Government purchasers of machine tools should set an example to others in this respect (*paragraph 52*).

I THE CYCLICAL PATTERN OF MACHINE TOOL ORDERS

TOTAL net new orders for machine tools have shown a marked cyclical pattern in the past decade, with peaks at constant (1958) prices of £115 million in 1955 and £136 million in 1960, and troughs of £60 million in 1958 and £79 million in 1963. Orders reached a new high level in 1965, and the industry is concerned that the past pattern of a cyclical downswing should not be repeated. This cyclical pattern of orders is illustrated in the graph annexed as Fig. 1.

2. We have attempted to identify the particular user industries mainly responsible for the fluctuations in orders. For this purpose we have examined the data available from the Board of Trade for investment in plant and machinery. These data, which go back only to 1957, are of expenditure charged to capital account in the year to which they relate, and may be compared with orders placed on average about a year before. They indicate that the machine tool industry's traditional customers—the iron and steel, motor vehicle and engineering, shipbuilding and metal goods industries—were spending heavily on new plant in 1961, and were probably responsible in large measure for the rise in the level of orders for machine tools observed in 1959/60. There was a marked upswing in investment in plant and machinery also in 1964, corresponding to the rise in machine tool orders in 1963/64, which was nearly as steep as that in 1959/60. But this time the heavy investment by the iron and steel and the motor vehicle industries that occurred in 1961 was not repeated; investment by the engineering group was again high, but much of the total rise in orders seems to have resulted from demands by non-traditional customers for machine tools included in the figures for ‘ other manufacturing industries ’. The Board of Trade statistics of investment do not permit a more detailed analysis of this group, which may represent new industries within the economy.

3. Because of the lack of detail in the figures, and because in any case they go back only to 1957 (and therefore cover only one complete cycle in machine tool orders), the results of this analysis must be treated with reserve. But it is possible to draw from it the negative conclusion that the cyclical pattern is not—as has sometimes been suggested—due mainly to fluctuations in the level of investment in machine tools by a single large user industry, such as motor vehicle manufacturing.

4. There is some evidence that the peaks in machine tool orders follow the corresponding peaks in orders for the mechanical engineering industry in general. This ‘ out of phase ’ factor is probably to be explained by the hypothesis that it is the growth of demand for the products of the engineering industry which provides the trigger action for subsequent high investment in machine tools. The increase in orders in boom periods encourages engineering firms to expand capacity, while shortage of skilled labour and rapidly rising labour costs (as shown by the data for two such periods, 1959/60 and 1963/64, which we have examined) lead them to seek ways of reducing costs by new investment in labour-saving plant.

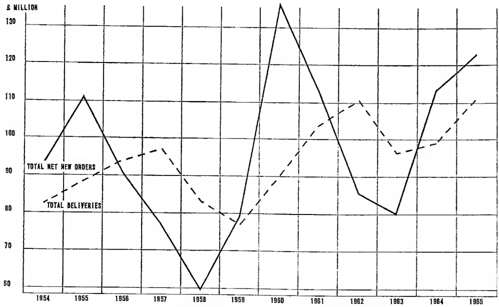

FIG. 1. Orders and deliveries of machine tools (values at constant 1958 prices)

5. Thus the general lack of long-term planning by many user industries, associated with variations in the degree of confidence with which at different times they regard the outlook for the economy as a whole and for their own business in particular, appears to be the immediate cause of the cyclical fluctuations in machine tool orders. It must be recognized however that these fluctuations are part of more general movements in the U.K. economy.

COMPARISON WITH OTHER COUNTRIES

6. We have examined evidence of the existence of cycles in orders for, and deliveries of, machine tools in a number of other important producing countries. The similarity of the patterns strongly suggests that the industries concerned are subject to common influences. Thus the trough of orders in 1957/59 and the peak in 1960/61 in Britain coincided with troughs and peaks, respectively, in Germany, France and the U.S.A. The amplitude of the fluctuations in production varied from one country to another among those we have examined, but in nearly all cases was greater (sometimes very much greater) than in Britain, as Table 1 shows. These figures discount differences due to underlying trends in the countries concerned. In those countries (such as Japan) where the machine tool industry was growing rapidly, setbacks are likely to have been less disruptive than in other countries where the growth of the industry was at best small, or even (as in the U.S.A.) negative.

Table I

Size of fluctuations in the output of machine tools for certain countries

Country	*Coefficient of variation about the trend line*
	%
U.S.A.	38
Italy	37
Japan	30
Denmark	13.5
Germany	13
France	11
United Kingdom	*10*
Sweden	9
Switzerland	3

Explanatory note:

Although the countries in the above table have provided data for slightly differing definitions of machine tools and of deliveries, and for slightly different periods of time, the method of calculating the figures shown is such that the significance of these discrepancies in the basic data is reduced to a minimum.

The 'trend line' in this case is that which most closely fits the actual production values for any country, when these are plotted over a series of years.

The sources used are as follows:

Board of Trade Export Services Branch
Board of Trade Library
Comité Européen de Cooperation des Industries de la Machine-Outil
Fuji Bank Bulletin
Ministry of Technology Statistics Branch
National Machine Tool Builders' Association, U.S.A.
Statistical Handbook on Japan
Times Review of Industry
VDMA Statistical Handbook.

COMPARISON WITH OTHER INDUSTRIES

7. It has been represented to us that the cyclical fluctuations in machine tool orders are greater than those for other capital goods industries. Evidence presented to the Economic Development Committee for Mechanical Engineering, however, shows that a number of such industries—for example textile machinery, mechanical handling equipment, chemical plant and steelworks plant—present a similar picture to that for machine tools. It is to be noted that some of these other industries are cushioned to a greater extent than the machine tool industry against the effects of cyclical fluctuations in home orders by the fact that a higher proportion of their total output is exported; we shall return to this point later in our Report.

II EFFECTS OF THE CYCLE

EFFECTS ON THE MACHINE TOOL INDUSTRY

8. The Economic Development Committee for the Machine Tool Industry has urged the need for action to deal with the cycle because of its harmful effects on the industry itself, and the Machine Tool Trades Association (M.T.T.A.) has put forward written evidence to us on this subject. We sought from the Association a quantified assessment of these effects, including the effect upon profits, in relation to a representative sample of individual member companies. The private and confidential nature of some of the information required prevented it from being provided in the form in which we had asked for it, but we have received from the Association case studies, prepared anonymously by five individual member companies, showing how they had been affected. These were prepared on the basis of index figures, and the small size of the sample means that it can hardly be representative. The studies concentrated in the main on the difficulties of recruiting and keeping in productive employment the industry's skilled labour force, rather than on demonstrating whether or not profits are significantly affected by cyclical fluctuations.

9. As might be expected, the seriousness of the effects on the individual companies varies with a number of factors, including the size of the company, the type of product manufactured (especially whether standard machines or 'specials'—that is to say, machines manufactured to the customer's own requirements), and the degree of dependence on particular markets. In general, however, the following are the main implications of the cycle for the industry, according to the evidence presented to us:

(*a*) During an upswing in orders, manufacturers find themselves unable to recruit additional skilled labour to match the rising volume of orders received. The industry has a high ratio of skilled to total labour (about 49 per cent in 1963 and 1964—higher than that of any other traditional engineering industry, except shipbuilding and repairing) and claims that, although it makes strenuous efforts to recruit and train workers, the way in which its cycle lags behind that of the rest of mechanical engineering means that any available reserves of labour have already been pre-empted by the time orders for machine tools begin to rise.

(*b*) The extent to which multi-shift working can be used to expand production in a boom is generally restricted, because in many areas workers (even if they could be found) object to this for social reasons.

(*c*) Although lengthening delivery times mean that fluctuations in production are less severe than fluctuations in orders, they may also lead to loss of orders to foreign manufacturers.

(*d*) At the peak of production, pressure on supplies of components (e.g. castings, and electrical control gear) creates further bottlenecks in production and may result in still longer delivery times.

(*e*) Although during the downward part of the order cycle production may initially be sustained by a backlog of orders, man-hours per unit of production tend to rise and capacity tends to be under-used, despite management control: as one manufacturer put it, it is natural for a man to make the job last longer if work is known to be short. A reduction in overtime is, understandably, often unwelcome to workers, who may prefer to seek other employment where more overtime is available.

(*f*) Nevertheless, managements may have no alternative, at the bottom of the cycle, but to put men on short time, or even to declare them redundant, although they thus make their own difficulties greater when orders begin to rise again.

(*g*) If manufacturers of standard types of machines make for stock, as some already do, in order to maintain production during a recession, they may find the cost heavy, in terms of financial charges, storage space, double handling and perhaps obsolescence.

10. As the above account indicates, the problem of maintaining its manpower (amounting to about 64 000 in all) looms very large in the industry's thinking. It may well have difficulty in recruiting the additional 12 000 employees that it is expected to require by 1970, according to the National Plan, although it is confident of doing so, and the number of skilled craftsmen included in the total is in any case expected to decline slightly. This underlines the need for substantial additional investment in automation and other methods of labour saving. The industry already has a relatively high percentage of numerically controlled machine tools (for example) as compared with the engineering industry in general. But concern about the effects of cyclical fluctuations has inhibited some machine tool manufacturers from planning for expanded capacity and increased efficiency of production.

11. The problem is aggravated by the fact that the trend underlying the cyclical pattern of orders has been only very gently rising upwards; when an industry is growing more rapidly, fluctuations in the volume of orders it receives have a less significant impact on the confidence of the industry. The National Plan postulates an average growth rate of 7·8 per cent per annum for the machine tool industry in the period to 1970, and if this can be achieved it may be that the cyclical problem will assume less prominence.

12. The amplitude of the fluctuations in the actual output of the industry is of course less than that of the fluctuations in orders received, because of the smoothing effect of varying delivery times, referred to in paragraph 9(*c*) above. Moreover, it is reductions in output, rather than in orders, that are immediately responsible for under-use of capacity, the laying-off of workers and lower profits. But if deliveries to customers at home and abroad are taken together, then in 5 of the 11 years for which we have information about deliveries the industry as a whole has been operating at or near the peak levels reached in 1957 and 1962. When deliveries in the lowest year (1959) are compared with the peak in 1962, it appears that over 75 per cent of the output of the industry has been unaffected by cyclical fluctuations at any time during those 11 years. Rough estimates on the same basis for the other capital goods industries referred to in paragraph 7 above suggest that their experience was broadly similar. Thus the figure for chemical plant manufacture was between 60 and

70 per cent, that for textile machinery and iron and steel plant between 70 and 80 per cent, and that for mechanical handling equipment between 80 and 90 per cent. In the light of these considerations, while we accept that the overall figures may conceal variations in the incidence of the effects upon manufacturers of standard machines and of 'specials', it would clearly be wrong to suggest that the machine tool industry as a whole had been uniquely, or even exceptionally, affected by cyclical fluctuations.

EFFECTS UPON THE INDUSTRY'S CUSTOMERS

13. Such information as we have received indicates that the machine tool industry's customers are not greatly affected by the cyclical problems of the industry itself, except in so far as these result in long, or unreliable, delivery times at the peak of the cycle. All the evidence suggests that users who buy imported machine tools are normally more influenced by technical specification and fitness for purpose than by price or delivery factors; no doubt however when home manufacturers are working to capacity and delivery times become unexpectedly long, some prospective customers will place orders for imported machines if they are promised early delivery of them. It is likely, indeed, that the inability of the home industry to supply their needs at times of peak demand has drawn customers' attention to the availability in some instances of better equipment abroad. Some will no doubt be so satisfied with their purchases of imported machines that they will go back for more, even when deliveries of the corresponding British models have returned to normal. There may thus be a 'ratchet effect', causing the home industry to lose some customers to its foreign competitors at each upswing; this should of course operate in reverse, in favour of British exporters, to the extent that some of their own products are superior to those of the domestic manufacturers in foreign markets.

14. As a number of the main industries using machine tools are represented on the Economic Development Committee for Mechanical Engineering, we sought the views of the Committee on the effects of cyclical fluctuations in machine tool orders and on possible ways of alleviating these. They commented that if more stability could be achieved in demand for users' products this would be reflected in the pattern of machine tool orders; the problem was similar to that of the engineering industry as a whole, which they were already trying to deal with by encouraging better maker-user relations. They suggested that one reason why machine tool users were reluctant to give longer notice of their requirements was that technological change in some categories or machines was likely to be rapid, and users would naturally wish to take advantage of the latest developments. The Committee thought, however, that the sales organizations of machine tool companies could help by emphasizing more forcefully to their customers the advantages of purchasing in periods of slack demand.

EFFECTS ON THE ECONOMY GENERALLY

15. We have seen no evidence to suggest that cyclical fluctuations in the machine tool industry have had a significant effect in retarding expansion of production by manufacturing industry as a whole, though it may be that shortage of capacity for producing some specialized machine tools not easily obtainable elsewhere could hold up investment plans in a particular sector of engineering. But the main effect on the general economy is certainly on the balance of payments.

16. Imports of machine tools have fluctuated cyclically during the past 10 years (see Fig. 2), the peaks (in 1956 and 1961) preceding the peaks in home deliveries by 6–9 months. Furthermore the fluctuations in imports have been relatively larger than those in home deliveries. These facts are consistent with the suggestion in paragraph 13 that the lengthening of delivery dates during the upswing (because home capacity has not expanded to match the peak level of orders) leads some users to turn to imported machine tools. It must be assumed also that lengthening delivery dates lead to some loss of exports. The sensitivity of Britain's economy to changes in the balance of payments must make these matters for concern. However it is probably unrealistic to suppose that specifically counter-cyclical action could do more than reduce the upswing by say 50 per cent, which would represent a gain to the balance of payments of some £2½ million. But if the basic demand for certain types of imported machines, determined mainly by technical considerations, can be reduced by action on the lines suggested by the Machine Tool E.D.C. (see Appendix IV, paragraph (*a*)(v)), then the cyclical upswing of imports would start from a lower level and thus be of less significance to the balance of payments.

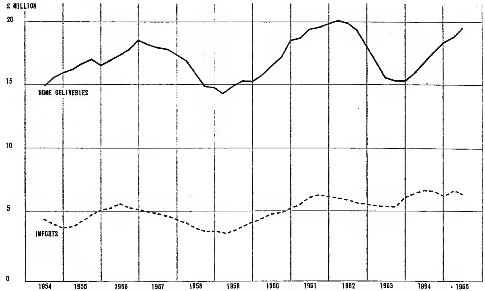

Fig. 2. Moving averages of U.K. imports and home deliveries of machine tools (values at constant 1958 prices—four-quarter moving averages)

III CONSIDERATION OF POSSIBLE MEASURES

17. A number of specific proposals have been put forward with the intention of reducing cyclical fluctuations in the machine tool industry, or mitigating their effects, and we comment on these in detail below. We should like first however to make some general observations.

18. The degree of self-confidence and dynamism varies greatly between one company and the next in the machine tool (as in any other) industry. A number of the more dynamic, forward-looking managements appear to take the view that the cyclical problem is not something peculiar to the machine tool industry; and that it is a fact of life which it is the business of management to deal with. In the present state of the economy, when greater competitiveness, the reduction of imports and increased exports are essential to our prosperity, it seems obvious that national policy should be on lines which assist efficient firms to be more successful, and bring about the redeployment to better purpose of resources which are at present used less efficiently. There is a danger that measures to give direct assistance to machine tool firms to weather the cyclical storm would, in addition to giving the impression that the industry was in poor shape, do little to help the most efficient (who in any case tend to be the most self-reliant and the least in need of outside help), but chiefly serve to make life easier for the less efficient. This danger, however, should not be so serious with measures addressed primarily to those responsible for the cyclical fluctuation of orders, namely the industry's customers; for while the weaker machine tool manufacturers might still gain some benefit, those with competitive products, efficient and adaptable productive capacity and dynamic sales organizations should be in a position to turn to the best advantage the greater certainty and stability, and confidence in the future, to which such measures would be expected to contribute.

19. We believe indeed that probably the most important objective of action in connexion with the cyclical problem is that users of machine tools should, in consultation with their suppliers, plan their future requirements (particularly for replacement) well ahead, and stick to their plans as far as possible despite temporary recessions in their own level of activity. By this means machine tool manufacturers can be helped to forecast future demand for their products, and thus to plan with greater confidence increases in the capacity of their plant. They can also be forewarned of any decline in orders for some of their products and either seek new customers for these (at home or abroad) or modify their product mix appropriately and in good time. Their customers in turn will benefit from closer consultation with the suppliers; by phasing their requirements of machine tools in the light of the manufacturer's order book and production plans, they can be assured that their own equipment programme will proceed smoothly, without costly delays in the delivery of items of plant, and that any special requirements can be taken care of.

20. The Government's proposals for a new system of investment incentives(1), based on cash grants to the manufacturing and extractive industries in respect of expenditure on new plant and machinery instead of on allowances set against tax, were published only as this report was being finalized, and we have had to conduct the greater part of our discussions in ignorance of them. But we understand that one important objective of the Government's proposals is that the new arrangement should be more direct and certain compared with the old system; if they achieve this, they should encourage forward planning of investment in plant and machinery, and thus have a material effect on the cyclical pattern. We have examined the following proposals in the light of the investment incentive proposals, and against the background of the considerations referred to in paragraphs 18 and 19.

INVESTMENT RESERVE SCHEMES

21. Of the possible solutions that have been suggested, that for an investment reserve first put forward by the M.T.T.A. some years ago has perhaps received most attention. Its purpose, and that of the Swedish scheme on which to some extent it is based, is to provide a fiscal incentive to companies to restrain their investment in periods of boom and to buy plant when demand is slack. It would do so by giving tax relief, in addition to the normal investment incentives, on profits used to buy Government interest-bearing 'plant modernization certificates' to be used later for investment, primarily (but not necessarily) in plant and equipment, at times when the Government has determined in the light of the economic situation that the funds set aside can be thus released. Details of the M.T.T.A. scheme are given in Appendix I, together with some notes on the relevant provisions in Swedish fiscal policy.

22. We have given considerable thought to this proposal, and possible simplified versions of it. There seem to be a number of difficulties some of which have apparently already been encountered in the operation of the Swedish scheme. The first is the need for a nice judgment in determining when the time is ripe for the release of counter-cyclical reserves to be authorized: there is normally a time lag at the start of a recession before a down-turn in economic activity is confirmed by the indices but if action was delayed until this confirmation was received, it might come too late to arrest the falling off in orders for new plant, and might only increase the subsequent pressure of demand in the upswing of the trade cycle.

23. Secondly there is the question of cost. We think that it would require a substantial bonus over and above the normal investment incentives to induce companies to put aside funds for future capital investment on a basis which enabled the Government, if not to control, at least to influence powerfully the timing of their subsequent expenditure. The extra stimulus under the Swedish investment reserve scheme is approximately equivalent to the grant of a tax credit of 7 per cent of expenditure on plant and 17 per cent (or more) of that on buildings, for which the depreciation period normally allowed is longer. It seems significant that some 90 per cent of reserves allocated under the scheme have been used for buildings, and only about 10 per cent for plant and

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(1) Investment Incentives (Cmnd. 2874). H.M.S.O., January, 1966.

machinery. Detailed studies in this country would be needed (of a kind which we are not in a position to make) in order to assess both the terms which it would be necessary to offer and the likely economic gains to the country compared with the cost to the Exchequer; to have any significant counter-cyclical effect however, the scheme would be bound to be costly, and either a reduction in other investment incentives or an increase in company or other taxation might be needed in order not to add to the overall burden on the Exchequer.

24. Perhaps the most serious objection, however, is that a new basis of company taxation is only just coming into operation, which has as one of its main purposes the encouragement of the retention of profits for investment in plant and machinery; at the same time, as we have mentioned earlier, the system of investment incentives is being altered to encourage more productive investment, and the Government are seeking through the National Plan to encourage steady growth and longer term planning. To superimpose on these changes a system of fiscal incentives to the creation of investment reserves would add complication, might well divert attention from the proper implementation of these new measures and policies, and would make it very much more difficult to assess the efficacy of these. There would also be a risk that an investment reserve scheme might encourage some firms not to do the long-term planning which as we have said above is the most important necessity, but to live from year to year, waiting for the time when the use of their investment reserves was fiscally most advantageous.

25. We have not been able to think of any variant of the M.T.T.A. or Swedish schemes which would be free from these objections, and we have therefore concluded that we cannot recommend the introduction of such a scheme at this time, even though we recognize that the best time to do so would be during, if not before, a time of boom. Nevertheless, if there is no improvement in the cyclical pattern of orders and if it appears that this is having serious effects upon the economy, then we think that detailed studies should be undertaken of the kind indicated in paragraph 23 above, and further consideration given in the light of them to the case for some scheme to give fiscal encouragement to the setting up of investment reserves.

GOVERNMENT UNDERWRITING OF MANUFACTURE FOR STOCK

26. Another suggestion which we have considered attacks the problem from a different angle by proposing that the Government should underwrite, for a small premium, a share—perhaps one-half—of the risks a manufacturer of machine tools bears who seeks to maintain production in a recession by making machines for stock, in the expectation that he will sell them profitably when demand rises later. This proposal has been put forward publicly by the Chairman of Staveley Industries Ltd.; we are grateful to Mr. Haviland for permission to include in our Report a description of his scheme (Appendix II) and for attending one of our meetings to discuss it with us.

27. The manufacture of machine tools for stock during periods of slack demand, as a means of off-setting market fluctuations, is not a new idea in itself, and as we have indicated above (paragraph 9(g)), some firms already

undertake it. In 1959, in an unpublished report⁽²⁾ on the machine tool industry of Western Europe, Professor Melman endorsed the practice, proposed that consideration should be given to ways of financing stockholding, and also asked whether it might not be better for stocks of components to be held, rather than of finished machine tools. Professor Melman's proposals were discussed in the report of a Sub-Committee of the Machine Tool Advisory Council, under the chairmanship of Sir Steuart Mitchell⁽³⁾, which commented:

> ' 66. We find ourselves unable to agree with this proposal, at any rate as a practical means of general application for offsetting market fluctuations, though we recognize that it could be—and indeed is—a useful method for individual firms to adopt on occasions. For example, one large United Kingdom firm during a recent period of six months has sold no fewer than 300 machine tools that had been manufactured but not sold during the recent recession in the industry. But there are obviously limits to which any company can go in regard to the policy of carrying stocks. Were the principle of manufacturing for stock to be pursued on the scale which Professor Melman has in mind, the industry might be involved in the holding for a period of as long as two or three years of £20–£30 million worth of machine tools. Apart from the difficulty of financing such a stock, experience with defence machine tools shows that the subsequent sale of these machine tools, by that time several years old, and possibly superseded by new designs, is likely to involve considerable losses '.

28. The scheme proposed by Mr. Haviland is intended to encourage more manufacturers than do so at present to make for stock both complete machine tools and modular units and components, by enabling them to share with the Government the risks involved. It is claimed that it would require a minimum effort to administer, and that it conforms to the normal practice of the industry. What proportion of the risk should be borne by the Government and what by the manufacturer would be a matter of judgment: but if their shares were roughly equal, the manufacturer would (it is suggested) have a strong incentive to avoid commercial losses. The national economy would benefit through the gain to the balance of payments from lower imports than would otherwise have taken place as demand rose, and from the fuller utilization of the industry's productive capacity. The Government would also receive the fees, or premiums, paid by manufacturers participating in the scheme, though these could only be small in relation to the sum assured (represented by the value of the machines made for stock) because of the heavy costs incurred by the manufacturer in a programme of stocking.

29. Mr. Haviland's proposal envisages that the Government would not exercise any control or discrimination, but that it would in effect back unquestioningly the judgment of machine tool manufacturers. Since it would be public funds that would be thereby put at risk, we cannot believe that

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(2) Report on the Productivity of Operations in the Machine Tool Industry in Western Europe, prepared by Professor Seymour Melman, Associate Professor of Industrial Engineering at Columbia University, New York, for the European Productivity Agency.

(3) The Machine Tool Industry: a report by the Sub-Committee of the Machine Tool Advisory Council appointed to consider Professor Melman's Report to the European Productivity Agency. Board of Trade, 1960.

Parliament would be prepared to vote monies for the purpose of such a scheme, unless a Government department accepted responsibility and was accountable to the Public Accounts Committee for their administration. This would inevitably mean setting up an administrative machine to examine specific proposals by manufacturers for programmes of stock-building to be insured by the Government; it would be necessary to take account, *inter alia*, of the stock-building plans of other manufacturers (whether or not put forward under an insurance scheme) and of the possibility that technical obsolescence might frustrate ultimate disposal. These are matters which we believe manufacturers are better able to decide for themselves, in the normal exercise of their commercial judgement, than any Government department, and we doubt whether the setting up of an administrative machine, and the recruiting of the necessary experienced staff (which could only be at the expense of industry), would be justified by the possible advantages to the national economy.

30. The alternative would seem to be a scheme in which the insurance premiums to be paid were actuarially calculated to cover the risks involved, so that Parliament could be assured that in the long run there would be no net charge to public funds. But this would certainly require a considerably higher level of premium than the nominal half per cent to one per cent which Mr. Haviland believes is the most that the scheme could stand. In any case we are advised that there should be no difficulty in manufacturing firms financing stock-building through normal commercial means at the sort of rates which would be involved in an actuarially self-balancing scheme.

31. We recognize, as did the Mitchell Sub-Committee, that individual manufacturers may well derive substantial benefits from a prudent programme of stock-building of standard machines, or of components or modular units, during recessions; this will enable them to take early advantage of the subsequent upswing in demand, and thus help to produce a smoother flow of deliveries, despite the cyclical fluctuation of orders. And as we have noted, a number of the leading companies in the industry already build for stock to the extent that commercial prudence justifies. But we doubt whether Government would be wise to take action which in effect would encourage firms to take uncommercial risks and for this reason as well as those in paragraphs 28 and 29, we cannot recommend any scheme for Government support of stock-building.

LEASING

32. It has sometimes been suggested that among the advantages to manufacturers of plant and equipment of leasing their products (as compared with sale outright or on hire purchase) is that it provides greater stability of revenue, profit and employment and strengthens the demand for capital goods in periods of recession—in short, that it has a counter-cyclical effect. In the U.S., for example, Mr. Richard R. MacNabb, Vice-President and Secretary of the Machinery and Allied Products Institute, has advocated this view, in a paper for a recent seminar organized by M.A.P.I. with the Council for Technological Advancement(4).

33. We agree that leasing has certain advantages over outright sale in encouraging customers for machine tools to plan ahead and to invest regularly in new equipment. As plant leases in Britain normally run for a fixed period, usually

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(4) Leasing of industrial equipment. M.A.P.I./C.T.A., 1965.

for five years or more, a prospective lessee will be led to examine his requirements for some time ahead and to budget accordingly. Smaller companies which do not have the cash to commit themselves to a lump sum payment or cannot obtain finance on acceptable terms from other sources may find that leasing will help them to overcome the problem of the cash flow, which is likely to be especially acute during a recession; in these ways leasing adds to the total volume of orders, and contributes in some degree to smoothing out the cycle.

34. Fears about the effect of corporation tax and doubts about the Government's future proposals for investment incentives (which have now been announced) have drastically reduced the rate of acceptance of new leasing business in this country, which was growing rapidly up to 1964. We welcome the recent announcement that under the new proposals, the lessor will receive the investment grant on leased plant and machinery. Now that the uncertainties have been removed, it seems likely that leasing of plant and equipment for the qualifying processes of manufacturing and extraction will resume its growth, and this will not in future be limited by the amount of tax liability against which the lessor could claim investment allowances, as under the old system. However, we have been told that there is some prejudice against leasing among customers for machine tools, who are said to regard it as hardly respectable. In the report published in March, 1965, of a survey of investment in machine tools conducted by the Management Consultants' Association for the National Economic Development Office and the M.T.T.A.⁽⁵⁾ a number of companies were found to object to leasing as 'swelling the profits of the Finance Houses'. We consider that the leasing of machine tools—as of computers and other industrial equipment—has its proper place among the forms of investment finance from which individual companies should choose, according to their circumstances, that which suits them best. We believe that the extent of the facilities available for leasing (apart from the temporary factors referred to above) may not be generally appreciated, particularly by those smaller companies who are likely to benefit most by making use of them. We recommend therefore that the machine tool industry should encourage its salesmen to bring them more actively to the attention of prospective customers. Closer co-operation between machine tool manufacturers and finance houses may be desirable; an example of this in Italy is the recently announced agreement between the Italian machine tool manufacturers' association and Locatrice Italiana, on medium-term finance for the leasing of machine tools. We hope also that our report may itself serve to bring the possibility of leasing machine tools to the notice of some who would otherwise have disregarded it.

35. Before leaving this subject, we draw attention also to what we regard as an undesirable lack of flexibility in the leasing terms now on offer. We have already mentioned that leases in this country usually run for five years or more: this is because the lessor is often a finance house which is not in the machinery business, but buys a machine tool at the specific request of the user and therefore requires him to go on leasing it until the purchase price has been completely recovered out of the rentals paid. Moreover, under the system of investment allowances, when a leased machine was sold outright within five years of the

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(5) Investment in Machine Tools: a survey by the Management Consultants' Association. H.M.S.O., 1965.

original transaction any allowances granted were liable to be refunded to the Inland Revenue. Consequently for a lessor to offer a lease with a shorter term, or with an option to the lessee to terminate after one or more years (as some companies in the United States do), he would have had to be reasonably confident of being able to find a second lessee when the first lease expired or was terminated, in order to avoid either having a machine idle and earning no rental or having to sell it and repay the allowances. The alternative course would have been for the lessor to cover himself for this risk by charging significantly higher rentals throughout, or a cancellation fee equivalent to the amount of the allowances to be refunded and payable if a lessee exercised the option of terminating the lease; but this would have nullified the attractions of the option in the eyes of the lessee. We think that 'experimental' leases on the American pattern might have advantages over the normal type available here, especially in encouraging users to try out in their own works machine tools of new and advanced designs, or where a machine is likely to be required for a shorter time than five years. Machine tool manufacturers would probably be in the best position to offer such leases, as lessors, securing re-finance elsewhere as necessary. However, there have been hitherto a number of tax difficulties (one of which has been mentioned above) in the path of a firm that wanted both to lease and to sell a given type of plant. We hope therefore that, when the Government's proposals for new investment incentives are being embodied in legislation, the arrangements will be such as to permit lessors to offer, not only in theory but also in practice, such leases (terminable after a minimum period of, say, twelve months) without being deprived of the benefit of investment grants on the machinery leased.

CONTRACTS FOR CONTINUOUS PLANT REPLACEMENT

36. A scheme (Appendix III) which one large machine tool company, Alfred Herbert Ltd., are now discussing with their customers, with a view to its introduction in their own business, provides an incentive (by way of a discount on the regular price of the machines payable at the end of each year) to enter into a contract to buy, annually for five years or more, a minimum value of machine tools manufactured by the company. The minimum annual value qualifying for the discount would be the average of a customer's purchases from the company over a previous period of years. Mr. R. D. Young, Vice-Chairman of Alfred Herbert Ltd., was good enough to attend one of our meetings to answer questions on his company's scheme and to give us the benefit of his views.

37. We welcome the Herbert scheme as a valuable contribution towards encouraging the forward planning of orders by users of machine tools, and a steadier flow of orders for British made machines, thus assisting in moderating the cyclical fluctuations felt by the manufacturers. From the explanations we have had from the company's representatives, however, the scheme appears to have certain limitations in its present form. In the first place, only the largest groups in the machine tool industry, making or factoring a comprehensive range of machine tools, are likely to be able to persuade their customers to enter into replacement contracts for substantial amounts; a smaller firm making specialized equipment will only expect to sell to an individual customer at infrequent intervals. Moreover, a user firm may be reluctant to tie itself to a single supplier for a long period (even though it need only contract to buy

from him part of its replacement programme), because of the possibility that other manufacturers may develop meanwhile better machines for its purpose. These difficulties would be overcome, or at least substantially reduced, if a contract could be offered by an organization acting as a clearing house for a number of different British manufacturers, or for the whole industry, so that user firms were given the widest possible choice of supplier. We recommend that the industry should examine carefully the possibility of introducing a scheme of this kind, with the necessary organization.

38. Secondly, however, and perhaps more important, we understand that the discount that Alfred Herbert Ltd. expect to be able to offer under their scheme is no more than about 5 per cent. Many companies in the industry, with smaller financial resources, would no doubt be hard put to it to offer even so much, and it is probable that some would be obliged to raise their selling prices in order to allow for a discount. The size of the discount that a user can expect to receive under the scheme is of course crucial to its success, since he has no other reason to commit himself to contract buying. We do not believe that a discount of the order of 5 per cent would be regarded as a sufficiently attractive inducement, especially as there is evidence that technical considerations, rather than price, are usually the determining factor in deciding a user whether to buy a particular machine tool.

39. We therefore suggest that serious consideration should be given to the provision of some sort of bonus, in addition to the standard investment grant, for users who enter into approved long-term contracts for future plant requirements. We find it impossible to say precisely how large this incentive would have to be in order to make an effective contribution towards alleviating the cyclical problem, but we think it would need to be at a level which, with the rebate offered by the manufacturer, amounted to 8 or 10 per cent of the normal selling price. Unless Government assistance of this sort is limited to contract programmes consisting wholly of machines of British manufacture, its counter-cyclical effect would be reduced; but we realize that this may not be consistent with Britain's international obligations. We are unable to recommend in what form it might be provided, and can only offer some tentative suggestions which we think might be worth consideration by the competent authorities:

(*a*) A preferential rate of investment grant might be given on expenditure under an approved contract for plant replacement.

(*b*) A customer might be permitted to claim an investment grant on the discount, or rebate, given him by the manufacturer under such an approved contract, as well as on the net amount of his expenditure.

(*c*) The M.T.T.A.'s scheme for 'plant modernization certificates' referred to in paragraph 21 above might be adapted for the purpose; the idea would be that the certificates could be used only in payment for plant and equipment bought under an approved contract.

COUNTER-CYCLICAL USE OF INVESTMENT INCENTIVES

40. We have considered whether there is a case for varying the level of investment incentives in accordance with the state of the trade cycle. The old system of investment allowances was too delayed in its effects for this to be a practical proposition, but one feature of the new system is that its operation

should be more immediate, and thus it would be theoretically possible to use it as a counter-cyclical regulator. However, we consider that any possible advantage would be more than balanced by the complication and uncertainty which would result, and which, as the White Paper already referred to points out, the new system is specifically designed to eliminate. Accordingly we have no hesitation in recommending that no attempt should be made to vary the rates of investment grant counter-cyclically.

USE OF OPERATIONAL RESEARCH

41. The suggestion has been made that the cyclical problem is one appropriate for the application of Operational Research. This has been conveniently defined (*The Economist*, 15th January, 1966) as 'The employment of scientific methods of analysis to provide executives with a quantitative basis for making operating decisions'. We agree that modern techniques of this kind are of the greatest value particularly in such matters as forecasting market demands and capacity requirements, and in production and inventory control, and their use can play an important part in assisting the machine tool industry to minimize the effects of the cyclical fluctuation of orders.

42. It is of course primarily for the managements of individual companies to take the initiative in exploiting these techniques. It is possible that a wide approach, covering if not the industry as a whole at any rate certain homogeneous sectors, may be practicable at a later stage. But we think it necessary to point out that the available statistics have serious limitations, some of which have been referred to in different places in this Report, and we think that both the Government and the industry will have to give attention to improving the speed with which the statistics are issued, and the amount of detailed information contained in them, if the maximum advantage is to be derived from the use of these techniques.

IV GENERAL CONSIDERATIONS AND CONCLUSIONS

43. In the following paragraphs we set out some general considerations and conclusions which have emerged from our discussions. Foremost among these is that fundamental changes of attitude are needed, both in the direction of the more rational and far-sighted planning of investment in new plant and equipment on the part of user industry, and in greater willingness on the part of the machine tool manufacturers themselves to expand, to modernize production methods, and to broaden the base of their markets. Without these changes, we do not believe that the possible lines of direct action which we have suggested in the previous section of this Report are likely to have any significant or lasting effect upon the cyclical problem.

44. We are convinced that it is in the best interests of machine tool users, no less than those of the manufacturers and of the economy as a whole, that as we have said earlier their managements should plan their investment on a long-term basis, in relation to expansion of capacity so far as this is practicable, and certainly in relation to regular renewal of their plant inventory. If users co-operate with their suppliers by discussing their needs with them well in advance, they can be warned of lengthening delivery times, and given the opportunity of phasing their orders so as to minimize the effects of these. The additional certainty given to the machine tool manufacturer's planning should give him the confidence to plan expansion, and this will be reflected back in better delivery times, and reduced risks of unexpected delays. Closer co-operation of this kind can also bring other benefits to both sides, for example by enabling the customer's experience to be applied to improvement of design.

45. The machine tool industry itself has certainly an important part to play in solving its own problems. The manufacturers' representatives on the E.D.C. for the industry have agreed in principle that productive capacity should be substantially increased. By providing a margin with which to cope with an up-swing in orders following a recession, without an undue increase in delivery times, such an expansion of capacity would enable the industry to compete more effectively with imports at the peak of the cycle, as well as at other times. The various other recommendations of the E.D.C. in their 'action programme' (summarized in Appendix IV) and the related action being taken by the Ministry of Technology are also directed to improving the competitiveness of the industry, both in home and overseas markets.

46. Conversely, a reduction in the amplitude of the cyclical fluctuations—such as we hope will follow from the other measures discussed in our Report—will itself bring about an increase in effective capacity (as the E.D.C. has pointed out), because resources of plant and labour will be more fully utilized.

47. Increase in capacity (effective or actual) may also be a necessary precondition of further penetration into export markets: an increase in exports, by providing a broader base for their operations, could help to insure British manufacturers against the extremes of cyclical fluctuations in their home market. A similar result could be achieved if individual manufacturers made

further efforts to seek wider outlets for their products in the home market, and even to diversify their range of products (though we realize that this needs to be balanced against the desirability, in particular cases, of increased rationalization and specialization).

48. There appears to be considerable scope for reducing the industry's dependence on a high proportion of skilled labour through the wider adoption of numerical control and other advanced techniques. By enabling the industry to deploy its limited manpower better and to deal more effectively with labour bottlenecks at periods of peak demand, this would increase the flexibility of its operations and thus contribute towards a solution of the cyclical problem.

49. Finally the concentration of the industry into more powerful and competitive units, the desirability of which has been recognized in the E.D.C. ' action programme ', should at the same time strengthen its ability to cope with the problems of fluctuating orders.

50. As well as the users and manufacturers of machine tools, the Government has a contribution to make. Although, as we have indicated in paragraph 18 above, we do not think it would be right for the Government to attempt to deal with the cyclical problem by means which merely bolster up the weaker elements in the machine tool industry, it has nevertheless a major responsibility, since the economy as a whole takes its tone from Government. A steady rate of economic growth, if it could be achieved, would do more than any other measure to create a climate in which industry could confidently plan ahead. Although Britain can never be isolated altogether from the effects of recessions elsewhere because of her heavy dependence on international trade, a sound economy at home will ensure that those effects are minimized. We have referred elsewhere to the National Plan, important objects of which are to provide industry with some assurance that economic policy will be directed to expansion and to minimize fluctuations in output by better planning. This is a new factor which has probably not yet had much impact on the thinking of the machine tool industry. But there is evidence elsewhere in industry (as the White Paper on Investment Incentives says) of growing emphasis on long-term expansion of capacity and modernization, regardless of short-term fluctuations in demand.

51. We think that the Government should continue to encourage this trend, and urge industrialists to take a long-term view of investment and to plan for regular purchases of new plant and equipment. The Ministry of Technology, with the Department of Economic Affairs and the National Economic Development Office, has under consideration the publication of a booklet drawing attention to the advantages of forward planning of investment in capital goods. We commend this idea, and hope that it will be put into execution without delay.

52. Although the Government is not a very large user of machine tools, and its purchases are to some extent subject to special factors not arising in private industry, it should nevertheless make every effort to set an example to other purchasers. The Royal Ordnance Factories and the Admiralty Dockyards and other shore establishments are the principal users, and we have consulted the Ministry of Defence about their purchases and in particular the scope for long-term planning of their future requirements. We are told that the R.O.F.'s

do try to plan ahead their replacement programme in consultation with suppliers, although the scope for them to make their purchases counter-cyclically is limited. The Navy Department also recognize the advantages of systematic planning of replacement of machine tools, and aim at a fairly steady flow of purchases year by year, as far as the system of Annual Estimates allows. We recommend that other Government establishments which use machine tools should similarly endeavour to draw up plans (in consultation with their suppliers) to meet their future requirements, for as far ahead as can be foreseen.

V POSTSCRIPT

53. When we embarked on our study we did not expect to find that a problem that has been the subject of so much discussion over a period of years, in the machine tool industry and elsewhere, could be solved by a single panacea, and our expectations have been confirmed by our general deliberations and our particular consideration of the various proposals that have been put forward. The available information suggests that other countries with major machine tool industries have also been unable to find a complete solution of the cyclical problem, and indeed that many suffer from sharper fluctuations than our own industry in Britain. And there is evidence that other of our capital goods industries suffer at least as severely. It is therefore hardly surprising if we have cast little new light on an already over publicized problem; at least however we hope that our Report will serve to put it in better perspective.

54. There can indeed be no certainty that any moderation of the cyclical pattern which it may be possible to achieve will of itself lead to a significant strengthening of the machine tool industry; on the other hand there can be no doubt that the stronger, the more virile and the more competitive the industry, the less will be its pre-occupation with the cycle and the greater its ability to rise above it.

(*Signed*) R. H. W. BULLOCK (*Chairman*)
R. C. BALFOUR
J. M. BEALES
B. R. CANT
WILLIAM CARRON
B. C. HARRISON
H. J. D. KEARNS
H. L. KING
D. J. PALMAR
P. K. PIERCY
J. F. SHEARER
C. TIMMS
C. E. COFFIN (*Secretary*)

Appendix I

Investment Reserve Schemes

THE M.T.T.A.'S PROPOSALS FOR PLANT MODERNIZATION CERTIFICATES

1. (*a*) A new form of document somewhat similar to a tax reserve certificate should be issued by the Government and should be entitled a ' plant modernization certificate '.

(*b*) A person carrying on a trade requiring the use of plant and machinery should be entitled during or within A months after the end of any accounting period to purchase plant modernization certificates for an amount not exceeding B per cent of his profits for that period as computed for profits tax purposes.

(*c*) Relief from income tax and profits tax at the rates applicable to the accounting period in question should be given on C per cent of the amount expended in acquiring plant modernization certificates.

(*d*) At any time within D years from the date of purchase of a certificate the taxpayer should be entitled to submit on an appropriate form particulars of a liability incurred by him for the acquisition of new plant (1) (to be defined for this purpose) and if necessary this form should be supported by statements from suppliers.

(*e*) On production of this form properly authorized (2) the taxpayer should be entitled to repayment of an equivalent amount of the plant modernization certificates held by him.

(*f*) The plant actually purchased should carry an entitlement to investment, initial and annual allowances on the normal basis.

(*g*) Until expended the plant modernization certificates should carry interest at the same rate as and on similar conditions to tax reserve certificates.

(*h*) The plant modernization certificates would not be negotiable in any circumstances. They would only be transferable:
(i) on a bona fide amalgamation, or
(ii) on a reconstruction where no change of beneficial interest is involved.

(*i*) If a plant modernization certificate is not utilized for the acquisition of plant within a period of D years from the date of purchase it should be repayable at par without interest. E per cent of the amount so repaid would be liable to income tax and profits tax at the rates in force at the date of repayment. Certificates would not be encashable at any earlier date except on condition that a discount would be charged in addition to the payment of tax on E per cent of the amount involved.

Notes: (1) The M.T.T.A. representatives have said that their scheme would not necessarily be limited to plant and machinery.

(2) They have also recognized that it would be necessary for the Government to control the repayment of the certificates, in accordance with the requirements of the economic situation.

INVESTMENT RESERVE ALLOWANCES IN SWEDISH FISCAL POLICY

2. The Swedish Government offer tax incentives to induce industrialists in the private sector to spread their investment activities more evenly. Companies may set aside, voluntarily, up to 40 per cent of their net profits before tax to ' investment reserves ', and are required to include in their annual tax return a statement of any allocation made to the reserves and of their intentions as to its utilization. Profits

so set aside are not liable to taxation, but a fixed percentage (46 per cent in 1964) of the total allocated must be deposited in a non-interest-bearing account with the Central Bank. This percentage is some 3 per cent less than the tax that would otherwise have been paid on the profits set aside—the first tax concession. The remainder of the profits set aside are retained in the company's accounts as an earmarked reserve.

3. When a stimulus is required to the economy the Government authorizes the release of the reserves, wholly or in part, to finance approved investment. Powers of direction on the use of the funds also exist, but have not been used so far. No tax is paid on the reserves so released (this is equivalent to an immediate 100 per cent initial allowance)—the second tax concession. In addition, a tax allowance equivalent to 10 per cent of the reserve used is granted—the third tax concession.

4. If the reserve is used without governmental agreement it becomes liable to tax and a penalty supplement of 10 per cent is added. If permission has not been given to use the reserve after five years, 30 per cent of it may be used without permission and without penalty, but the additional 10 per cent allowance is not given.

5. A special investment reserve scheme was applied in 1960 and 1961, at a time of high demand. Under this the whole reserve set aside by the company was paid into the Central Bank. At a later date the excess 54 per cent was released and the remaining 46 per cent became an ordinary reserve. To induce companies to participate in the special scheme an additional and immediate tax relief was provided equivalent to 10 per cent per annum interest on the extra amount deposited in the Central Bank.

6. Under both schemes, the release of the reserves may be authorized for an individual company, for companies in a sector of industry or a geographical region, or generally for all those taking part in the scheme. But permits to withdraw the funds are issued on an individual basis, so that consideration can be given as to the timing and method of utilization of the funds. Most of the permits granted to date have been for building projects. This is mainly due to the fact that under Swedish law plant and machinery may be written off over five years, while the depreciation period for industrial buildings is at least 20 years, and may be much longer. Thus the advantage of using the investment reserve scheme, compared with normal depreciation allowances, is markedly greater for buildings than for plant. There has been, however, at least one general release of reserves limited to orders for plant and machinery, in 1962. Usually approval for the purchase of plant and machinery is restricted to the ordering of Swedish products.

7. The timing of measures under the scheme is said to have been only moderately successful. In the 1958/59 recession the down-trend came rather sooner than expected and it did not last as long as was forecast. In 1961 the boom lasted longer than was forecast and the 1962 fall in demand came a little later and persisted longer. Both industry and the Government agree that the use of the investment reserve provisions in 1962 helped to raise the level of activity in that year by advancing investment projects which would otherwise have been implemented later. But this effect was due at least in part to the difficulty of raising finance by other means.

Appendix II

The Staveley Scheme for Insurance by the Government of a Programme of Manufacturing Machine Tools for Stock

1. Mr. D. W. G. L. Haviland, Chairman of Staveley Industries Ltd., has proposed a scheme under which the Government would underwrite part of the risk taken by manufacturers in making for stock complete machine tools, and also component and modular units. Details of Mr. Haviland's proposals are set out below:

(*a*) It is proposed that the Government should adopt a policy of insuring the manufacture of machine tools for stock. Under this some appropriate Government agency would carry half the risk of an approved programme of manufacture for stock by an approved manufacturer. The Government facility would therefore permit a company otherwise able to finance such a programme to undertake one twice the size that it would be prepared to carry at its sole risk.

(*b*) One of the main problems of the Machine Tool industry is that of cyclical demand. During times of slump, capacity is under-used. During times of boom, capacity is inadequate to meet demand. An aspect of this which gives concern to the Government is the large number of foreign machine tools which are bought in time of boom instead of British types which would have been bought if they could have been supplied within a shorter time. Many companies already make for stock within the limits of their commercial judgment, availability of finance and willingness to carry a risk during a prolonged period of slack trade. The balance of payments would be improved in time of boom if larger stock building programmes were undertaken in time of slump. The M.T.T.A. has made proposals to the Government for increasing the demand for machine tools in time of slump. These are endorsed by Staveley. The scheme put forward in this note is proposed to supplement the M.T.T.A. proposals and is designed to increase still further the value of tools made to stock in time of slump whenever this is judged to be desirable. It could be used both by the Government and by any interested company as a ' regulator ' immediately demand fell below an adequate level.

(*c*) For reasons of simplicity and the lack of officials experienced in the machine tool trade it is desirable to limit to a minimum the extent to which Government departments or officials need to take a physical part in administration of any such venture. The whole physical process of administration, including possible determination of the moment at which unsaleable stock should be disposed of for less than cost and subsequently written off at a loss in the company's books, should therefore be the responsibility of the company. The sole function of the Government should be to underwrite half the risk and therefore to pay half any loss certified at the end of a programme. To the Government, the test of the commercial worthwhileness of any given programme should be the willingness of a company to put its own money at risk in a venture. From this point of view it would probably be undesirable to ask the Government to carry more than half the risk, for this would weaken the commercial basis of the whole venture. Machines chosen for stock manufacture need to be chosen with care; but the history of manufacture of machine tools for stock in recent years indicates that the risk of loss should be small. The Government should, however, be recompensed for carrying a share of the risk by the payment of an insurance premium, expressed as a percentage of the assessed value of that part of an agreed programme actually completed. Since the cost of manufacture for stock is high, the scheme could not bear more than a nominal charge, say ½ or 1 per cent, if much use is to be made of the facility. The main result that the Government can expect from the scheme is an improvement in the balance of payments for at worst a small expenditure.

Appendix III

Draft Heads of Terms for a Contract for Continuous Replacement of Machine Tools Manufactured by the Alfred Herbert Limited Group of Companies

1. The purpose of the Contract is for:

   The User to replace plant in fixed continuous annual amounts, and so qualify for the rebate provided in Clause 4(*b*).

   The Manufacturer to be assisted in maintaining even levels of production.

2. ' Machine Tools ' as used in these Heads of Terms only refer to machine tools of the types set out in the Schedule hereto and it is understood that reference is only made to the basic machine inclusive of standard tooling but exclusive of special tooling.

3. The User will agree:
   - (*a*) to purchase machine tools on a planned annual programme.
   - (*b*) to contract with the Manufacturer to spend annually during each of the five years next following the signing of such Contract not less than an agreed amount on new machine tools.
   - (*c*) to issue to the Manufacturer orders:
     - (i) for Year 1 at least *three months* before start of the year, *together with* a draft programme for Year 2.
     - (ii) for Year 2 in final form *two months* before the end of Year 1, *together with* a draft programme for Year 3.
     - (iii) for subsequent years in the same way as (ii) above.
   - (*d*) to undertake only to order machines for permanent use in his own plants in the U.K. and not to include any for resale.
   - (*e*) payment for machines ordered under this Contract will be due at the end of the month following the month of delivery.

4. The Manufacturer will agree:
   - (*a*) to quote prices for each year's programme at least two months before it starts and that the basic prices and the terms and conditions of supply shall be the same as those applied to other U.K. Users.
   - (*b*) to pay to the User at the end of each year of the contract a rebate calculated on the total invoice value of the machine tools delivered during that year.
   - (*c*) that any machine tools ordered and delivered in any year in excess of the contract total shall qualify for the said rebate.
   - (*d*) to collaborate with the User to provide specialists to study each year's programme so as to ensure that the most economical and productive machines and their equipment are supplied for that year's quota of replacement.
   - (*e*) to deliver the Machines comprised in each year's programme in accordance with the arrangements made at the time the order is placed, or as may subsequently be mutually agreed.

5. When the Manufacturer is able to do so he will be free to manufacture the machines comprised in any two consecutive years' programmes in any one year provided the User is able to advance the preparation of such programmes. The User undertakes

to use his best efforts to advance his programmes when requested to do so by the Manufacturer. A programme thus made in advance will, unless called for earlier by the User, be held by the Manufacturer for delivery until the year concerned.

6. The parties will negotiate separately for the disposal of the plant replaced by each year's programme without obligation on either party to sell or buy.

Schedule

Machines Manufactured by the Alfred Herbert Group but not including Machines Sold by Alfred Herbert Ltd. as Agents

Lathes	Capstan with Manual and Automatic Control Combination Turret Cross-sliding Turret Copy Turning Precision Centre and Toolroom Production Lathes Threading CRI-DAN Chucking Automatic
Milling Machines	Vertical Horizontal
Boring-Milling	Herbert/DeVlieg Jigmils
Copy Milling	Keller Diesinkers
Planing Machines	
Drilling Machines	Sensitive and Turret Head with Manual and Tape Control
Tapping Machines	Manual and automatic
Grinding Machines	Junior Surface Tool and Cutter
Gear Cutting Machines	Fellows
Shaping Machines	
Broaching Machines	Horizontal
Keyseating Machines	
Lapping Machines	
Utility Heads	
Injection Moulding and Diecasting Machines	

Appendix IV

National Economic Development Council Machine Tool Industry: Programme for Action

The measures proposed by the Machine Tool Economic Development Committee are as follows:

(a) BY THE INDUSTRY

The representatives of the manufacturers have undertaken to press for action by the industry as below and report progress from time to time to the Economic Development Committee.

(i) *Increased capacity:* the representatives of the manufacturers agree in principle that productive capacity should be substantially increased. A reduction in cyclical fluctuations would itself have the effect of increasing capacity. A growth of capacity would enable the industry to meet more successfully the competition from foreign machines in the home and export markets. Details will need to be worked out firm by firm and will carry with them implications for skilled labour supplies, professional staff, etc. Action resulting will be reported to the Economic Development Committee;

(ii) *Research and development effort:* there should be a further substantial increase in the technical staff engaged in design, and the research and development effort should be intensified;

(iii) *Qualified engineers:* the industry has at present 950–1000 qualified scientists and engineers. It is intended to raise this to about 1600 by the end of 1968*. The educational implications will have to be taken up with the appropriate Government Departments and training boards;

(iv) *Supporting research:* in addition to general research on machine tools themselves, there should be a greater research and development effort into cutting tools; the benefits would accrue generally and should be a subject for co-operative research between manufacturers of cutting tools and machine tools;

(v) *Imports:* manufacturers undertake to make a detailed examination of imports by the industry and to identify a limited number of types, at present dominated by imports, which could be manufactured in the U.K. A concentrated and co-operative effort with the appropriate firms to develop these types will then be made;

(vi) *Specialization and structure:* experience shows that these are matters of great importance and difficulty. The manufacturers are examining in detail the pattern of home production and the structure of the industry with a view to increasing the concentration of effort and specialization of design and production;

(vii) *Co-operative evaluation:* the manufacturers will consider the possibilities of a programme for testing and evaluating each other's machines in their own works, on a non-competitive basis;

(viii) *Stockholding:* the industry will aim at holding larger stocks where appropriate as a means of securing better export deliveries and reducing the demand for imports;

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* Qualified scientists and engineers are as defined in White Papers on Scientific and Engineering Manpower in Great Britain.

(ix) *Merchants:* the manufacturers will examine carefully the scope for making use of merchants for selling and stocking unsophisticated, standard machines, so improving deliveries and discouraging imports;

(x) *Selling methods:* the manufacturers undertake:

(*a*) to examine the need for strengthening their technical sales staff, and

(*b*) to consider the greater use of selling consortia;

(xi) *Joint effort with electronics firms:* the manufacturers will undertake to seek a further strengthening of the technical development effort on a joint basis with the electronics industry and of selling effort by the machine tool industry in relation to joint products of the two industries;

(xii) *Factoring:* the industry will present a balanced statement setting out clearly the national disadvantages and advantages of the factoring (i.e. marketing) by British machine tool companies of foreign machine tools, and will seek to minimize the disadvantages and maximize the advantages;

(xiii) *Customer relations:* the industry will encourage a pioneering spirit on the part of customers by making widely known the advantages and potentialities of more productive, more advanced machine tools.

(*b*) BY THE GOVERNMENT*

The Economic Development Committee consider that the Government should take the following action:

(i) *Fiscal incentives to plant modernization:* although the investment allowances are normally taken into account by companies in calculating their cash flows, the recent investigation on behalf of the Economic Development Committee by the Management Consultants' Association† suggests that the present investment and initial allowances are commonly disregarded when specific investment decisions on machine tools are being reached. The Economic Development Committee considers that these allowances should be revised or replaced by a system providing a sharper and more immediate incentive to modernize the country's machine tool stock. The arrangements should be made better known;

(ii) *Investment appraisal:* the provision should be encouraged of comprehensive information to help guide machine tool purchases in reaching rational decisions on re-equipment. This information would include data on performance, taxation and allowances, costs, etc. and guidance on appraisal of the various factors;

(iii) *Counter trade cycle investment:* an incentive system should be introduced to encourage re-equipment during the early stages of plant investment recessions. The Swedish system and also the Machine Tool Trades Association proposals of 1962–63 should be examined as possible methods of dealing with them;

(iv) *Tax encouragement for research and development:* there should be preferential tax relief for current research and development expenditure on machine tools;

(v) *Purchase of prototypes:* the Government should state its readiness to purchase advanced prototype machine tools; these could be installed in users' works or Royal Ordnance Factories where they would have a productive function and could be fully evaluated. The price to be paid for these prototypes should include a substantial element of repayment for development costs;

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* The Minister of Technology is examining various forms of Government action.

† Investment in Machine Tools. National Economic Development Council. H.M.S.O., 3*s*. 6*d*.

(vi) *Encouragement of new techniques:* Government production contracts in the engineering and allied industries should encourage advanced methods by stipulating the use of new techniques in appropriate cases, e.g. numerically controlled machine tools;

(vii) *Stimulating interest in technology:* the supply of trained engineers is inadequate for current and future needs of the machine tool industry and the means of increasing it should be examined. Places for engineering students at universities and CATs are not being taken up and means of stimulating public interest in machine tool technology as a career should be further examined;

(viii) *University work on machine tools:* an additional university should be encouraged to develop a department specializing in machine tool technology. The necessary facilities should be provided so as to make possible additional scholarships at Manchester and the new department. The amount of the grants, particularly for married post-graduate students, is too low and should be reviewed;

(ix) *Government example:* the Government and nationalized industries should set an example by examining the condition of machine tools in their own establishments, and should plan vigorous modernization programmes accordingly. These should be arranged to fall principally in recession periods, and consideration should be given by the Government to the manner and timing of the disposal of the displaced machines;

(x) *Exhibition centre:* there is a need for new exhibition buildings in, or near London providing facilities for engineering and many other industries, with full modern amenities to attract overseas buyers. Energetic Government support is required if this idea, which has been under consideration for many years, is to come to fruition.

(*c*) BY THE UNIONS

Support for high productivity plant: the trade union members agree in principle to support the maximum use of high productivity equipment by machine tool makers and users and will provide a paper for discussion at the Economic Development Committee giving their views on the broad questions of productivity and how it can be increased.

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MINISTRY OF TECHNOLOGY

Report of the Working Party on the Problems Arising from the Cyclical Pattern of Machine Tool Orders

LONDON
HER MAJESTY'S STATIONERY OFFICE
1966

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* Mr. G. H. Doughty withdrew from the Working Party in September, 1965, owing to increased pressure of other commitments.

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